Before the
Federal Communications Commission
Washington, D.C.

In the Matter of	)	
Reallocation of the 216-220 MHz,	)	**WT Docket No. 02 - 08**
Government Transfer Bands	)	**RM-9854**
	)	**RM-9882**
Notice of Proposed Rule Making		**FCC 02-15**

COMMENTS OF DATA FLOW SYSTEMS, INC.

In response to a "Notice of Proposed Rule Making" issued by the Federal Communications Commissions (FCC) regarding the "reallocation" of the 216-220 MHz band of frequencies and the FCC's solicitation of public comment on the "flexibility that should be afforded new or incumbent licensees, and the technical and other service rules that should govern the range of existing and proposed services" in the 216-220 MHz band, Data Flow Systems, Inc. (DFS), hereby submits its comments.

I. Background.

DFS manufactures/assembles installs and provides support services for Supervisory Control and Data Acquisition (SCADA) systems for the water utility industry. DFS's SCADA system is radio telemetry based (i.e. the radio transmission of data from a remote source to a receiving station for recording and analysis). DFS was founded in 1981 and has grown to become the largest provider of SCADA systems for potable, reuse, and wastewater monitoring applications in the Southeastern United States. DFS's SCADA system supports the operations of utilities ranging in size from large public water utilities which serve hundreds of thousands of customers to smaller rural water cooperatives and water districts which serve only a few thousand customers each. Each of these utilities depends upon reliable and secure SCADA communications to assist them in carrying out their public service mission.

Across the United States, water utilities have become dependent upon radio frequency based SCADA systems to monitor and control remotely the operation of their infrastructure delivery systems. SCADA systems of this type monitor via radio communication critical water utility equipment (such as sewage lift stations and freshwater pumping stations) located and operating at geographically dispersed and frequently remote sites, retrieving critical data and processing and monitoring the data for anomalies.

In the event of a fault, SCADA systems automatically respond to protect the health and safety of the public and a utility's delivery infrastructure by independently issuing alarms to appropriate public safety authorities, the utility's operating staff and maintenance personnel. Further, SCADA systems automatically initiate actions such as the opening/closing of valves and/or the throwing of electrical switches to isolate a problem and prevent it from cascading into a catastrophic event.

The suggestions enclosed herein are not self-serving, but will benefit all users of the radio spectrum by improving the efficiency with which allocated. While our comments are not designed to benefit any single business or industry, their implementation will assist thousands of water and wastewater utilities in their efforts to better serve the hundreds of millions of citizens who depend on the utilities' ability to safely and efficiently deliver their services.

II. **General Comments on issues under consideration for the 216-220 MHz band.**

In the opinion of DFS the focus of the FCC's management activities on "promoting more efficient use of the spectrum as well as increasing the amount of spectrum available for new services while continuing to ensure access to adequate spectrum for essential incumbent services"[1] is justified and appropriate. However, DFS strongly disagrees with the Commissions overriding preference for allowing "market forces" to determine the allocation and management of the nations radio spectrum, one of our counties scarcest and most endangered **Public Resources.**

Astute, technically oriented commentators will agree that the dual missions of promoting more efficient use of the spectrum and increasing the amount of spectrum available for new services must, of necessity, be driven by the laws of physics. That is, decisions with regard to frequency allocation (i.e. eligibility for transfer from **Public Ownership** to **Private Ownership** via auction, authorization of radio services and licensing) and administrative rule making must take into consideration and conform with the unique and diverse physical characteristics and capabilities of each individual band of frequencies. To do otherwise will not only result in the establishment of a system of radio frequency allocation and administration which is by its nature inefficient, but also consign technological development in the field of wireless communication to a future of artificially imposed limitations and restrictions.

DFS strongly believes that the interest of the United States, its citizens, and both Public and Private radio service users will best be served by a close matching of the needs and requirements of existing and future licensees with the known capabilities of each radio frequency band. Put simply, DFS proposes that the round peg of licensee needs and requirements be placed in the round hole of the band of frequencies that possesses the performance characteristics that meet but do not exceed the requirements of those users.

DFS invites the FCC to consider the history and current status of radio frequency based telemetry applications as an example of how the assignment of a user group to an inappropriate band of frequencies has resulted in a decrease in both the availability and the efficiency of spectrum in the United States.

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[1] Paragraph 15, FCC 02-15.

Historically, radio telemetry users, uses and technological development has been inhibited by a lack of available frequencies in bands which are suited to telemetry applications and, with the exception of the 150-174 MHz band, it's designation by the FCC as a Secondary user. These limitations combined with a nearly universal requirement among users (particularly critical infrastructure utility users) that they be able to broadcast data on an uninterrupted basis, around the clock, 365 days a year caused many users to abandon the voice radio dominated 450-470 MHz bands and seek out more favorable spectrum in the 216-220 MHz band. The 216-220 MHz band delivers superior signal integrity in hilly and/or mountainous terrain due to the propagation characteristics inherent in these frequencies. It is a technically accepted fact that the longer wavelength signals of the 216-220 MHz frequencies are less effected by mid path obstructions, and ground absorption than shorter wavelength signals. This band of frequencies also has the ability to freznel over or around modest obstructions and can to a certain extent reach beyond normal horizon limits. Thus, the performance characteristics of the 216-220 MHz band are much better suited to SCADA telemetry applications then those of the 450 to 470 MHz Land Mobile Bands.

The move away from the ill suited spectrum gained momentum in mid 1980 when an explosion in the demand for SCADA supported water utility service outstripped frequency availability in its allocated bands. In an ill fated attempt to increase the availability of spectrum for utility applications the FCC opened the 928-956 MHz band to telemetry as a primary user. Unfortunately, the propagation characteristics of this band are even worse than in the 450-470 MHz bands and were, therefor, rejected by many of its intended users. Thus, utility telemetry users, most specifically, water utility telemetry users became the Boat People of radio spectrum in the United States.

Like most refugees, spectrum Boat People sought to immigrate to a land of opportunity. For many the land of opportunity proved to be the 216 – 220 MHz band of frequencies. Here water utilities found a frequency band having performance characteristics that allowed them to communicate at low power over the long distances which comprise their service areas.

Beyond this, in the 216-220 MHz band telemetry users found that they could employ state of the art antenna technology to limit the invasiveness of their broadcast activities on the public and other spectrum users while maintaining the continuous communication connectivity that they required.

As word spread among water utilities that refuge for their telemetry operations could be found in the 216-220 MHz band, the pace of immigration to that band increased. Today approximately 309 utility licensees are using frequencies within the 216-220 MHz bandwidth nationwide. Of these licensees a total 235 or 76.1% of the utilities occupying this ban are water utilities, strong testimony to the fact that this category of spectrum user finds the performance characteristics of 216-220 MHz band (the "round hole") is the best fit for the "round peg" of water utility telemetry applications.

While we at DFS subscribe to and endorse the FCC's position that "It is in the Public Interest to afford licensees flexibility in the design of their systems"[2], we feel strongly that to the extent that the FCC's spectrum allocation scheme fails to recognize the unique characteristics and capabilities of each individual band of frequencies and dovetail those capabilities with the needs of the users of radio frequency, administrative initiatives such as those contemplated in NPRM FCC 02-15 will fail to significantly increase the efficient use of spectrum and/or increase the amount of spectrum available for new services.

In the alternative, DFS proposes to increase spectrum availability and the efficiency of spectrum use by dedicating 3 MHz of band width (217-220 MHz) nation wide to water utility telemetry applications. This proposal is consistent with our previously stated position pertaining to the need for the appropriate matching of scarce spectrum resources with the intended and appropriate uses of new and existing licensees. Under our proposal, the following actions would be necessary:

- All new water utility telemetry licenses would be restricted to the 217-220 MHz band were their user status would elevated from Secondary to Primary.
- After the expiration of their first 10 year renewal term Secondary use incumbent licensees in the 150-174 MHz and 450-470 MHz will be required to relocate as Primary users to the 217-220 MHz band. All incumbent water utility telemetry Primary licensees in the 928-956 band would not be required to relocate.
- Frequency spacing within the 217-220 MHz band would be immediately reduced from the current 25 KHz to 12.5 KHz for new and renewal licensees. Frequency spacing for incumbent users would be reduced to 6.25 KHz at the expiration of their 10 year license renewal period.
- If universal protocols, such as Modbus are employed by an applicant, they will be required to include message coding in the emission designator portion of their applications. This will allow other co-channel applicants and/or coordinators to select the proper non-interfering coding from a list of approved coding schemes (example: Inverted Data, Non-Inverted Data, etc…).

Note: While we feel that the advent of cell phone technology and the wide availability of cell phone service has rendered AMTS obsolete and thus a candidate for termination, incumbent AMTS users in the 217-220 MHz band may be tolerated on a co-primary basis under our proposal.

Under our proposal the following benefits would be realized:

- The relocation of incumbent secondary telemetry users from the 150-174 MHz and 450-470 Mhz band would open literally thousands of channels to spectrum users nationwide for non-telemetry applications.
- A reduction in frequency spacing from 25 KHz to 6.25 KHz would provide a 360 channel (or 300%) increase in the number of channels available in the 217-220 MHz band with only minimal adverse effect on performance.

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[2] Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40 GHz Bands, Report and Order and Second Notice of Proposed Rule Making, 12 FCC Rcd 18600, 18616. 26 (1997).

- Telemetry users are able to employ various coding techniques that make possible a reduction in the minimum geographic spacing between co-channel users creating a frequency multiplier effect.
- Critical Infrastructure Utilities now operating on a secondary basis will be elevated to primary status and thus protected from arbitrary displacement by Primary non-critical voice users.

While a definitive study has not been undertaken by DFS we concluded that given the fact that local governmental units (i.e. cities, counties, water control districts, etc..) typically derive their water utility service from one and at most two water utilities, under our proposal the availability of suitable radio frequency spectrum to critical infrastructure water utility applications would be sufficient to support the public health and safety missions of water utilities ad infinitum.

DFS recognizes that the dedication of a band of frequencies, no matter how small, to the exclusive use of a single category of users will be controversial. However, in view of the demonstrated economies in spectrum availability and efficiencies in frequency use that would result from the adoption of our proposal and the criticality of radio frequency based SCADA telemetry to the nation's fresh and wastewater utility systems and thus the health and safety of all Americans[3], it is necessary and appropriate that these utilities be allocated radio spectrum for their exclusive use. The 217-220 MHz band of frequencies is best suited for this task and should, therefore, be set aside and dedicated to utility telemetry uses nationwide.

III. Specific Comments on issues under consideration for the 216-220 MHz band.

Issue No. 1: Whether to authorize new services under either part 27 or part 101 of FCC's rules.

Comment:

DFS has no comment.

Issue No. 2: Whether to license new services by geographic service areas.

Comment:

DFS favors site-by-site licensing as it will provide users in the 216-220 MHz band the ability for closer co-channel reuse, thus increasing the efficiency of spectrum utilization within that band.

Issue No. 3: Whether to provide for partitioning and disaggregation of licensed spectrum.

DFS's Comment:

DFS endorses allowing licensees to partition their service areas and disaggregate their spectrum as a vehicle for increasing the versatility of our nations scarce spectrum resources.

[3] Documented by DFS in its comments before the National Telecommunications and Information Administration in the matter of the, Spectrum Use Report and the Study of the Use of Radio Spectrum by Critical Infrastructure Industries, a copy of which is attached and by this reference is made part of these comments.

Issue No. 4: Whether secondary telemetry in the 217-220 Mhz band should be licensed on a site-by-site basis.

DFS's Comment:

DFS endorses site-by-site licensing. See our comments under issue No. 2 above.

Issue No. 5: Whether to add technical specifications to FCC rules part 90 covering telemetry operations.

DFS's Comment:

DFS recommends that the Public Safety Radio Pools eligibility requirements under 90.20 be expanded to include Critical Infrastructure Utilities. We further recommend that 90.16 be amended to include the 217-220 Mhz band as an additional spectrum resource dedicated to Critical Infrastructure Utilities and that telemetring be elevated to co-primary status under 90.259. Such actions are indicated by national security considerations and the fact that Water utility systems across the nation are faced with the dual challenges of providing economical water utility services to a rapidly growing and increasingly geographically widespread population, and complying with an expanding inventory of complex and costly environmental regulations.

DFS further recommends that the following technical specifications be adopted:

- Channel spacing of 6.25 KHz. – Will increase the efficiency of spectrum utilization.
- Maximum radio power output of 2 watts. – Consistent with the FCC's preference for the utilization of the minimum amount of power required to accomplish the desired communication.
- Maximum antenna height of 500 feet. – This height is the maximum required to cover geographic service areas that correspond with the service areas of even the largest local governmental unit with a single frequency.
- 18 dB F/B Ratio for directional antennas. – Will contribute to a general decrease in co-channel spacing.
- Minimum 60 dB down out of band spurious emissions. – Will contribute to a decrease in adjacent channel interference.

Issue No. 6: Whether to apply the frequency coordination procedures of Section 90.175 to the authorization of future telemetry operations in the 218-220 MHz band.

DFS's Comment:

DFS endorses the application of the frequency coordination procedures of Section 90.175 to the authorization of future telemetry operations in the 218-220 MHz band.

Issue No. 7: In the event that the FCC adopts a "licensing scheme" in which mutually exclusive applications are accepted for filing, the FCC must resolve such mutually exclusive applications by competitive bidding. The FCC proposes to conduct the auction of such licenses in conformity with the general competitive bidding rules set forth by the FCC in Part 1, Subpart Q of the Commission's Rules.

DFS's Comment:

DFS Endorses the application of competitive bidding to the resolution of mutually exclusive applications and that such auctions be conducted in conformity with the general competitive bidding rules set forth by the FCC in Part 1, Subpart Q of the Commission's Rules.

Before the
National Telecommunications and Information Administration, U.S. Department of Commerce
Washington, D.C.

In the Matter of
National Telecommunications and Information Administration,
Spectrum Use Report.
Study of the Use of Radio Spectrum by
Critical Infrastructure Industries.

COMMENTS OF DATA FLOW SYSTEMS, INC.

In response to a "Request For Comments" issued by the National Telecommunications and Information Administration (NTIA) regarding the NTIA's upcoming Spectrum Use Report and its associated study into the use of radio spectrum by Critical Infrastructure Industries (CII), Data Flow Systems, Inc. (DFS), hereby submits its comments in support of the dedication of the 216-220 MHz band to water utility telemetry uses nationwide. The dedication of the 216-220 MHz band to water utility telemetry uses nationwide will facilitate the safe and reliable delivery of water utility services to the public.

I. Background.

DFS manufactures/assembles installs and provides support services for Supervisory Control and Data Acquisition (SCADA) systems for the water utility industry. DFS's SCADA system is radio telemetry based (i.e. the radio transmission of data from a remote source to a receiving station for recording and analysis). DFS was founded in 1981 and has grown to become the largest provider of SCADA systems for potable, reuse, and wastewater monitoring applications in the Southeastern United States. DFS's SCADA system supports the operations of utilities ranging in size from large public water utilities which serve hundreds of thousands of customers to smaller rural water cooperatives and water districts which serve only a few thousand customers each. Each of these utilities depends upon reliable and secure SCADA communications to assist them in carrying out their public service obligations.

Across the United States, water utilities have become dependent upon radio frequency based SCADA systems to monitor and control remotely the operation of their infrastructure delivery systems. SCADA systems of this type monitor via radio communication critical water utility equipment (such as sewage lift stations and freshwater pumping stations) located and operating at geographically dispersed and frequently remote sites, retrieving critical data and processing and monitoring the data for anomalies. In the event of a fault, SCADA systems automatically respond to protect the health and safety of the public and a utility's delivery infrastructure by independently issuing alarms to appropriate public safety authorities, the utility's operating staff and maintenance personnel. Further, SCADA systems automatically initiate actions such as the opening/closing of valves and/or the throwing of electrical switches to isolate a problem and prevent it from cascading into a catastrophic event.

II. Critical Importance of Radio Telemetry Based SCADA Systems to the Water Utility Industry.

Water utility systems across the nation are faced with the dual challenges of: (1) providing economical water utility services to a rapidly growing and increasingly geographically widespread population, and (2) complying with an expanding inventory of complex and costly environmental regulations. Nowhere is this more true than in populous states which are experiencing rapid residential population growth.

For that reason, this analysis will focus on the states of California, Texas and Florida (the nations first, second and fifth most populous states[1]) which experienced population growth rates (13.6%, 22.8% and 23.5% respectively) over the past decade, well in excess of the nation's total population growth rate of 13.1%.

1. Providing Economical Water Utility Services To A Rapidly Growing & Geographically Widespread Population.

As Table II-1 documents, the population growth experienced by the nation as a whole, and the subject states individually, over the past ten years is projected by the U.S. Census Bureau to continue through the year 2025.

Table II-1	Population 2015 (Projected)	Population Change 2000-2015 (Projected)	Population % Change 2000-2015 (Projected)	Population 2025 (Projected)	Population Change 2000-2025 (Projected)	Population % Change 2000-2025 (Projected)
USA	310,133,000	28,711,094	10.2%	335,048,000	53,626,094	19.1%
California	41,373,000	7,501,352	22.1%	49,285,000	15,413,352	45.5%
Florida	18,497,000	2,514,622	15.7%	20,710,000	4,727,622	29.6%
Texas	24,280,000	3,428,180	16.4%	27,183,000	6,331,180	30.4%

Source: U.S. Census Bureau, Census 2000.
U.S. Census Bureau, Projections of the Total Population of States.

The addition of 53.626 million residents to the nation's population over the next 25 years (28.71 million residents by 2015 and another 24.92 million residents by 2025) will make necessary a significant expansion of the nation's fresh and wastewater supply sources, transportation infrastructure, and disposal destinations. These new residents will consume an additional 4.307 billion gallons of freshwater per day by the year 2015[2] and produce a corresponding increase in wastewater effluent. By the year 2025, the nation's daily freshwater consumption will have increased by a projected 8.044 billion gallons per day over current consumption levels with wastewater effluent generation increasing commensurately[3].

Unfortunately, the U.S. Census bureau has not yet made available its "2000 Housing Characteristics Report". This report provides valuable data pertaining to the nation's housing inventory including, among other things, the freshwater supply and wastewater disposal methodologies that they employ. The 1990 report of the Census Bureau is, however, available and has been employed in creating Tables II-2 and II-3, which appear below.

Table II-2 presents data reporting the number and percentage of U.S. housing units who in 1990 received their freshwater from Public or Private Utility Companies, Private Wells and Other Sources.

1990 Fresh Water Sources and Utilization

Table II-2	Total Housing Units 1990	Public/Private Utility Service	% of Total Housing Units	Private Well	% of Total Housing Units	Other Source	% of Total Housing Units
USA	102,263,678	86,068,766	84.2%	15,131,691	14.8%	1,063,221	1.0%
California	11,182,882	10,668,942	95.4%	464,621	4.2%	49,319	0.4%
Florida	6,100,262	5,298,184	86.9%	794,558	13.0%	7,520	0.1%
Texas	7,008,999	6,417,136	91.6%	566,716	8.1%	25,147	0.4%

Source: U.S. Census Bureau, Census 1990. Housing Characteristics Report.

Table II-3 reports data on the number and percentage of housing units who in 1990 disposed of their wastewater via public sewer, septic tank or cesspool, and other means.

Source: U.S. Census Bureau, Census 1990. Housing Characteristics Report.

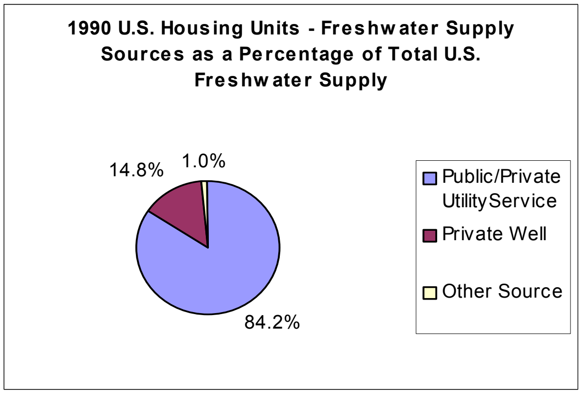
1990 Wastewater Disposal Methods

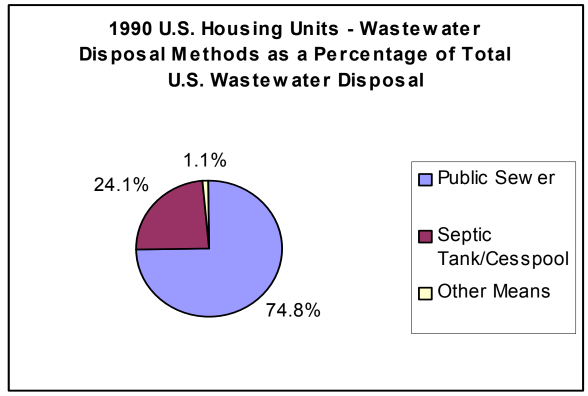
Table II-3	Total Housing Units 1990	Public Sewer	% of Total Housing Units	Septic Tank/Cesspool	% of Total Housing Units	Other Means	% of Total Housing Units
USA	102,263,678	76,455,211	74.8%	24,670,877	24.1%	1,137,590	1.1%
California	11,182,882	10,022,843	89.6%	1,092,174	9.8%	67,865	0.6%
Florida	6,100,262	4,490,793	73.6%	[illegible]	25.6%	[illegible]	0.7%
Texas	7,008,999	5,690,550	81.2%	1,266,713	18.1%	51,736	0.7%

[1] U.S. Census Bureau, Census 2000 Brief "Population Change and Distribution" (2001 C2KBR/01-2).

[2] Based on the national per-capita water consumption average of 150 gallons per person per day as reported by the U.S. Environmental Protection Agency.

[3] Based on the national per-capita water consumption average of 150 gallons per person per day as reported by the U.S. Environmental Protection Agency.



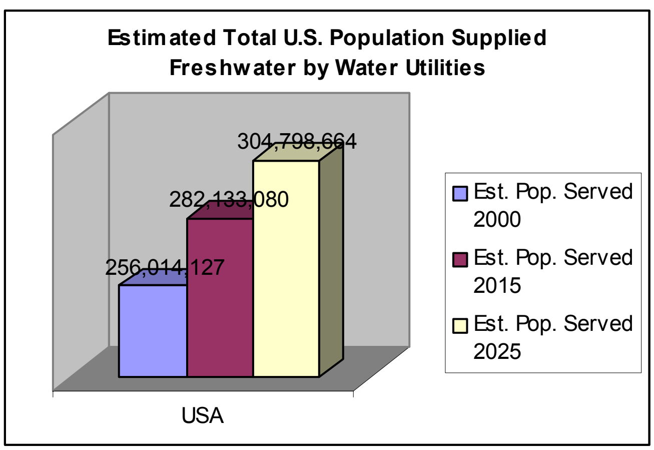


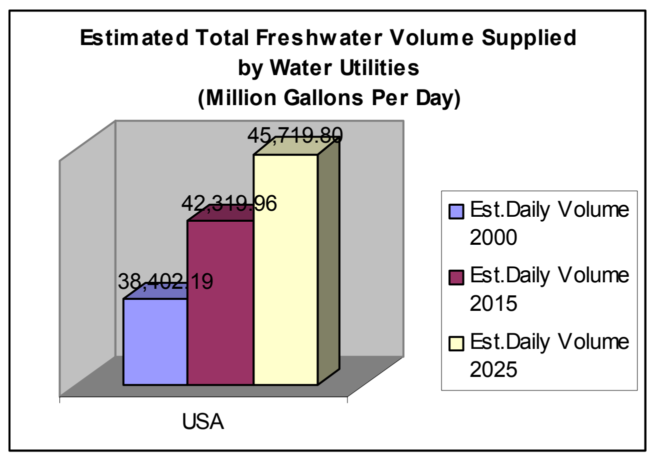
With 84.2% of the nation's housing units receiving their freshwater from water utility companies and 74.8% disposing of their wastewater via public sewer in 1990, it is clear that the responsibility for and burden of supplying freshwater to and disposing wastewater from an expanding U.S. population will be assumed primarily by the nation's water utility companies.

To assess the impact of continuing population growth and the nation's reliance on water utility companies for fresh and wastewater service, the author has applied U.S. Census Bureau projected population growth rates to the U.S. Census Bureau, Census 1990 Housing Characteristics Report. By so doing we have derived and published in Table II-4 and II-5 below an estimate of the populations which will rely upon water utility companies to meet their fresh and wastewater needs through the year 2025 and the volumes of fresh and wastewater that that population will consume and produce.

Estimate of Freshwater Utility Populations Served & Daily Volume Demand.

Table II-4	Public/Private Utility Est. Population Served 2000	Public/Private Utility Est. Population Served 2015	Public/Private Utility Est. Population Served 2025	Estimated Daily Volume (Million Gallons Per Day) 2000	Estimated Daily Volume (Million Gallons Per Day) 2015	Estimated Daily Volume (Million Gallons Per Day) 2025
USA	256,014,127	282,133,080	304,798,664	38,402.19	42,319.96	45,719.80
California	33,814,572	41,303,283	49,201,951	5,072.19	6,195.49	7,380.29
Florida	16,096,413	18,628,977	20,857,767	2,414.46	2,794.35	3,128.66
Texas	21,513,063	25,049,956	28,045,015	3,226.96	3,757.49	4,206.75



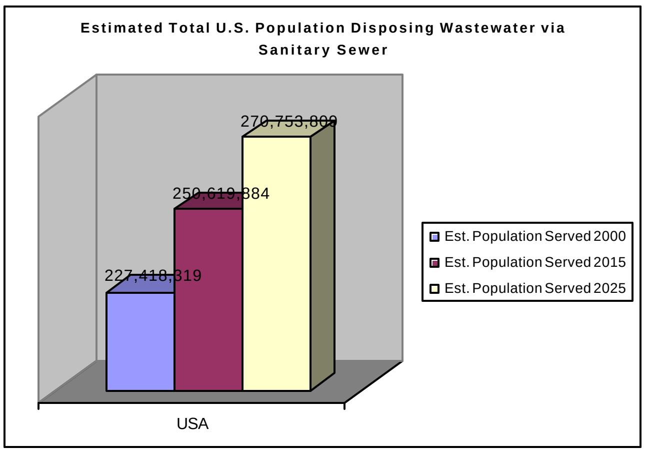


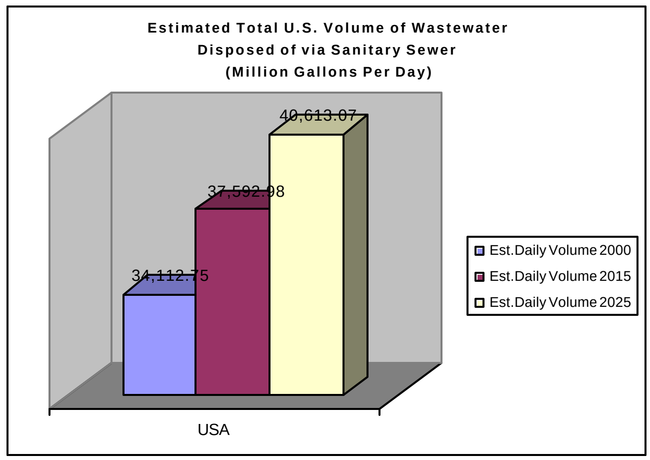
From April 2000 through April 2025 the number of US residents who rely upon utilities for their fresh water will expand an estimated 19.1% (or 48,784,538 residents) to 304,798,664 residents. To meet this growth, utilities will have to produce an additional 7,317.61 million gallons per day (MGD) of freshwater.

Over the next 25 years, the demand on freshwater utilities located in the most populous and rapidly growing states will be even more burdensome. It is estimated that California, Florida and Texas utilities will be forced to contend with user/customer growth rates of 45.5% (15,387,379 new users), 29.6% (4,761,354 new users) and 30.4% (6,531,951 new users) respectively. These new users will consume an estimated 2,308.10 MGD of freshwater in California and an additional 714.2 MGD in Florida and 979.79 MGD in Texas.

Estimate of Utility Provide Public Sewer Populations Served & Volume Processed Daily.

Table II-5	Public Sewer Est. Population Served 2000	Public Sewer Est. Population Served 2015	Public Sewer Est. Population Served 2025	Estimated Daily Volume (Million Gallons Per Day) 2000	Estimated Daily Volume (Million Gallons Per Day) 2015	Estimated Daily Volume (Million Gallons Per Day) 2025
USA	227,418,319	250,619,884	270,753,809	34,112.75	37,592.98	40,613.07
California	31,766,800	38,802,003	46,222,337	4,765.02	5,820.30	6,933.35
Florida	13,670,821	15,821,749	17,714,680	2,050.62	2,737.26	2,657.20
Texas	19,077,227	22,213,652	24,869,593	2,861.58	3,332.05	3,730.44





As table II-5 demonstrates, population growth and the associated increase in freshwater consumption is projected to flow through to the wastewater utility industry affecting both the number of residents served and the volume of effluent processed. From 2000 through 2025, the number of residents served by public sewers nationally is projected to expand by 43,335,490 residents to 270,753,809 residents. These new users will contribute an additional 6,500.32 MGD in wastewater effluent to the nation's water utility systems bringing the total volume of wastewater processed nationally to 40,613.07 MGD.

As is the case with freshwater demand, the burden placed on wastewater utilities by an expanding population will be most heavily felt by those utilities located in the most populous and rapidly growing states. In the states of California, Florida and Texas, the author projects that user growth will require utilities to expand their processing capacity by 2,168.33 MGD, 606.58 MGD and 868.86 MGD respectively by the year 2025.

Without question, the increased demand for water services that will be brought about by an expanding population will challenge utilities across the nation. While the statistics cited thus far have given strong testimony to this fact and have shown that utilities located within the most populous and rapidly growing states will bear the brunt of nation's water processing burden, they have not as yet addressed the unique challenges that the nation's population growth and location trends present to the nation's metropolitan areas and water utilities.

The statistics which appear below, have been provided to give the reader a sense of the scope of the challenge which continuing and rapid permanent resident population growth will present to metropolitan water utilities:

- Nationally, 80.3% percent of America’s total population or 225.98 million people live and work in the nation's “metropolitan areas”.
- Over the ten year period 1990-2000 the population within metro areas increased by 13.9%, while the populations of non-metropolitan areas grew by just 10%.
- Almost one-third of all residents (29.9%) live in the nation’s largest metropolitan areas (metro areas with total populations of at least 5 million) such as California’s Los Angeles-Riverside-Orange County metro area, San Francisco-Oakland-San Jose metro areas, and Texas’s Dallas-Fort Worth metro area.
- Metro areas with populations between 2 million and 5 million, such as Florida’s Miami-Dade County metro area, account for 14.4% of the nation’s total population.
- Metro areas with populations between 1 million and 2 million residents’ house 13.2% of the nation’s total population.
- Nationally, metro areas with populations over 5 million grew 10.8% in the 90’s, while metro areas with populations of 2-5 million experienced a 19.8% growth rate and metro areas having populations of 1-2 million grew at a rate of 17.7%.
- Collectively, metropolitan areas with populations of 1 million or more accounted for over half (57.4%) of the nation’s total population or 161,517,899 people as of April 2000 and were responsible for 62.5% of the nation’s total population growth over the past 10 years adding 20.44 million residents.

Source: U.S. Census Bureau, Census 2000. 1990 Census, Population and Housing Unit Counts, United States (1990 CPH-2-1).

The metropolitan areas of Los Angeles-Riverside-Orange County, California; San Francisco-Oakland-San Jose, California; Dallas-Fort Worth, Texas; and Miami-Dade County, Florida have been selected for individual scrutiny. The metro areas selected were chosen because they are representative of a majority of the nations metropolitan areas. That is, each of the selected metro areas are located within states experiencing rapid permanent resident population growth while they themselves are experiencing significant individual population growth. Most importantly, however, is the fact that all of the selected metro areas are experiencing rapid population growth in regions of their cities and counties which had been previously unincorporated, undeveloped and sparsely populated. This demographic trend is commonly known, and frequently referred to as urban and/or suburban sprawl and refers to dispersed residential and commercial development outside of established compact urban centers.

Noted policy analyst Anthony Downs, at a 1998 Transportation Research Conference sponsored by the U.S. Dept. of Transportation, identified the following ten traits as being identifying characteristics of metropolitan areas experiencing “Urban Sprawl”:

1. Unlimited outward extension.
2. Low-density residential and commercial development.
3. Leapfrog development.
4. Fragmentation of powers over land use among many small localities.
5. Dominance of transportation by private automotive vehicles.
6. No centralized planning or control of land-uses.
7. Widespread strip commercial development.
8. Great fiscal disparities among localities.
9. Segregation of types of land-uses in different zones.
10. Reliance mainly on the trickle-down or filtering processes to provide housing to low-income households.

Clearly, the selected metropolitan areas of Los Angeles-Riverside-Orange County, California; San Francisco-Oakland-San Jose, California; Dallas-Fort Worth, Texas; and Miami-Dade County, Florida embody these ten characteristic traits.

To demonstrate the impact of continuing population growth on the fresh and wastewater needs of these metropolitan areas, the author has developed Tables II-6 and II-7, which appear below. In creating these tables, the author has applied the same methodology used to develop Tables II-4 and II-5 thus projecting population and flow volume totals through the year 2025.

Estimate of Freshwater Utility Populations Served & Daily Volume Demand For Selected Metropolitan Areas.

Table II-6	Public/Private Utility Est. Pop. Served	Public/Private Utility Est. Pop. Served	Public/Private Utility Est. Pop. Served	Estimated Daily Volume (Million Gallons Per Day)	Estimated Daily Volume (Million Gallons Per Day)	Estimated Daily Volume (Million Gallons Per Day)
	2000	2015	2025	2000	2015	2025
La-Riverside-Orange Cty.	14,524,821	16,369,473	18,448,396	2,178.72	2,455.42	2,767.26
San Francisco-Oakland-San Jose	3,925,578	4,420,201	4,977,146	588.84	663.03	746.57
Dallas-Fort Worth	4,311,752	5,575,095	7,208,598	646.76	836.26	1,081.29
Miami-Dade County	2,414,970	2,808,610	3,266,413	362.25	421.29	489.96

Estimate of Utility Provided Public Sewer Populations Served & Daily Volume For Selected Metropolitan Areas.

Table II-7	Public Sewer Est. Pop. Served	Public Sewer Est. Pop. Served	Public Sewer Est. Pop. Served	Estimated Daily Volume (Million Gallons Per Day)	Estimated Daily Volume (Million Gallons Per Day)	Estimated Daily Volume (Million Gallons Per Day)
	2000	2015	2025	2000	2015	2025
La-Riverside-Orange Cty.	13,939,732	15,710,078	17,705,258	2,091.00	2,356.51	2,655.79
San Francisco-Oakland-San Jose	3,874,134	4,362,275	4,911,922	581.12	654.34	736.79
Dallas-Fort Worth	4,220,567	5,457,193	7,056,150	633.08	818.58	1,058.42
Miami-Dade County	2,081,955	2,421,314	2,815,988	312.29	363.20	422.40

The cost of expanding, operating and maintaining the fresh and wastewater infrastructure required to meet the projected needs of these metropolitan areas will be greatly increased by the fact that these utility services must be provided over large and topographically diverse areas. For example, in the Los Angeles-Riverside-Orange County, California metro area by the year 2025 water utility companies must be prepared to provide freshwater to an estimated 6.428 million households (18.45 million residents) and sanitary sewer service to an estimated 6.169 million households (17.7 million residents) dispersed over 12,057 square miles. Similarly, the San Francisco-Oakland-San Jose, Dallas-Fort Worth, and Miami-Dade County metro areas serve resident populations dispersed over 2,076 square miles, 1,743 square miles and 1,946 square miles respectively.

Studies conducted over the past 30 years have universally concluded that when development is spread out at low densities (a.k.a. Urban Sprawl) the per-unit cost of constructing and maintaining public water and sewer systems increases[1]. The reason for this is that as development extends outward from a metropolitan area's core, non-recurring utility infrastructure and recurring service and maintenance costs increase exponentially. Put plainly, low density development requires more miles of sewer and water lines than high density urban development. These water and sewer lines must be constructed, maintained, repaired, monitored and controlled, each function of which having its own associated individual costs.

Documentation of the impact of urban sprawl on the non-recurring infrastructure expansion costs of utilities may be found in a study completed by Oregon's Center for Urban Studies (PSU). In that study it was reported that "streets, utilities, and schools for a suburban single family development with three dwelling units per acre built five miles from sewage and water treatment plants in a leapfrog pattern would cost $43,381 per dwelling in 1987 dollars. Building the same development adjacent to existing development and near central facilities would reduce costs by $11,597 per dwelling unit"[2]

The impact of urban sprawl on a utility's recurring operating costs (i.e. repair, maintenance and system administration costs) are realized in the form increased logistical costs (i.e. travel man hours, fuel and transportation equipment expenses) and decreased operating efficiency. As a utility system expands geographically, the travel time for repair and maintenance crews and operating staff to and from remotely located equipment sites increases.

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[1] The Urban Land Institute, *The Case for Multifamily Housing*, 1991.

[2] Center for Urban Studies (PSU) and Regional Financial Advisors, Inc., *DLCD's Local Government Infrastructure Funding in Oregon*, 1990.

Beyond the logistical difficulties encountered by metro utilities as a result of urban sprawl, as critical equipment facilities become more dispersed and remote, utility operators/administrators increasingly encounter delays in receiving critical equipment and system status information from those locations. Such delays at best decrease the operating efficiency of a utility and at worse result in catastrophic events that may damage or destroy equipment, endanger the health and safety of a utility's staff and the residents that they serve, and harm fragile local ecologies and those down stream from an event site.

Clearly, urban sprawl places an enormous burden on local governments and utilities. By increasing both the non-recurring cost of system infrastructure expansion and the recurring costs of system repair, maintenance and administration, urban sprawl has forced governmental officials and utility managers to make hard decisions regarding the allocation of their limited resources between the creation of new infrastructure and maintaining their existing infrastructure. By so doing, a serious gap between the nation's water utility infrastructure needs and current water utility infrastructure spending has developed.

The Water Infrastructure Network (WIN), a coalition of water, wastewater, engineering, government and environmental groups predicts an annual funding gap of $23 billion over the next 20 years between the nation's current annual level of investment in infrastructure and that which is required to meet both the current and future water utility needs of the nation[1]. WIN has estimated that if the full $23 billion infrastructure funding gap is financed with utility rate increases, it would "result in a doubling or tripling of rates across the nation[2]". According to WIN, a doubling or tripling of water utility rates would result in at least one-third of the population of the United States having to pay more than 4% of their household income for water and sewer service[3].

Faced with an expanding demand for water utility service in an environment dominated by fiscal budget limitations and consumer/voter demand for low cost utility service, local governments and their utilities have overwhelmingly embraced radio frequency based SCADA telemetry as a source of operational economy.

Prior to the availability of SCADA telemetry, water utilities universally employed a manual inspection methodology to verify the status of their system (well levels, flow volumes, pump run times etc.) and the condition of their operating equipment (temperature, oil level, valve integrity etc). This methodology is by its nature extremely labor intensive, inaccurate and subject to lengthy delays in the detection and reporting of equipment failures and system anomalies such as pump station overflows and spills.

Under the manual inspection methodology, water utilities must constantly maintain crews in the field for the purpose of monitoring and reporting their system's status and the operating condition of remotely sited equipment. Field inspection crews typically travel a proscribed circuit visiting each of a utility's remote equipment sites at a mandated frequency. While at each site field inspection crews assess the condition of operating equipment and record system status information which they then report to their utility's managerial staff. In the event that an equipment or system problem develops at a site between site inspections, a utility's operating, repair and maintenance personnel would not become aware of the problem until such time as the site is visited again or a concerned citizen, or a public safety officer reports an actual wastewater ground spill.

In stark contrast to the manual inspection method of system monitoring, radio frequency based SCADA telemetry permits water utilities to monitor from remote locations extremely accurate and dependable system and equipment sensors and control their system's plants and geographically dispersed pumping and lift stations in real time, 24 hours a day. In the event that a malfunction occurs, alarm messages are automatically and instantaneously transmitted to appropriate utility personnel and locations in accordance with a water utility's established operating protocol thus reducing customer service interruptions and the occurrence of wastewater system overflow situations resulting in ground spills.

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[1] Water Environment & Technology Magazine, March 2001 Edition.
[2] Water Environment & Technology Magazine, March 2001 Edition.
[8] Water Environment & Technology Magazine, March 2001 Edition.

SCADA systems may also be programmed to automatically optimize the performance of system equipment and thereby reduce a utility's power consumption and repair and maintenance costs. For example, SCADA systems may be programmed to alternate or suspend the use of a pump or pumps at multi-pump lift stations thereby reducing energy costs and equalizing the wear on the site's pumps extending their individual and collective operating life and reducing the frequency of repair and maintenance activities. SCADA equipped sites may also be programmed to communicate with one another in real time via radio frequency for the purpose of coordinating their efforts. For example, a lift station which is experiencing unusually high flow volumes may direct upstream stations to suspend the transfer of effluent to it until such time as its well level has been reduced.

For utilities of the size and complexity required to serve the populations of even the smallest metropolitan area the employment of SCADA technology has become an economic necessity. While no hard data is available in the public record, it is obvious that for metro water utilities such as Miami-Dade County's Miami-Dade Water and Sewer Department (MDWASD) the savings are significant. MDWASD operates the largest collection and transmission system in Florida, serving over 329,000 retail sewer customers and 13 wholesale customers. The utility's service area covers nearly 400 square miles of Metro-Dade County and consists of 1,500 miles of force main, 2,500 miles of gravity sewer, and over 900 pump and lift stations. The system discharges wastewater to three treatment plants that collectively treat up to 325 million gallons per day. The MDWASD's sewer system facilities are monitored and controlled by an extensive SCADA system[4].

In the absence of a SCADA capability, each of MDWASD's three treatment plants and 900 plus pumping stations would require manual monitoring. The cost of staffing to perform on-going manual system monitoring, excess energy consumption, increased equipment repair, maintenance and replacement expense and the probability of the occurrence of an undetected system malfunction resulting in a catastrophic release of wastewater into the environment are such that operating the MDWASD system without SCADA telemetry is not a viable option[5].

While information pertaining to the utilization of radio frequency based SCADA by water utilities nationally or at the state and county level is unavailable, conclusions in this regard may be derived from a poll of Central Florida utilities which was recently completed by Data Flow Systems, Inc. The poll covered utilities located in and serving the Central Florida counties of Brevard, Indian River, Osceola and Polk. Within these counties twenty-four water utility companies and one Water Management control district were found to exist. The poll revealed the following statistics:

- 8 utilities or 33.3% of the 24 water utilities located within the study area employed radio frequency based SCADA systems in the monitoring and control of their **fresh water systems**.
- 11 utilities or 45.8% of the 24 water utilities located within the study area employed radio frequency based SCADA systems in the monitoring and control of their **wastewater systems**.

In that the Central Florida counties studied contain no major metropolitan areas, where the utilization rate of utility provided fresh and wastewater utility services are the highest[6], the radio frequency based SCADA utilization rate derived from the poll must be considered to be less than those of the state and the nation as a whole.

Therefore, the application of the water utility radio frequency based SCADA utilization rates found to exist in the polled Central Florida counties to the nation's water utilities (as seen in Tables II-8 and II-9 below) provides an extremely conservative estimate of the number of households and residents currently served and projected to become served by radio frequency based SCADA monitored and controlled fresh and wastewater utility systems.

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[4] Florida Water Resources Journal, April 1998 edition.
[5] Florida Water Resources Journal, April 1998 edition.
[6] U.S. Census Bureau, Census 2000; 1990 Census, Population and Housing Unit Counts, United States (1990 CPH-2-1).

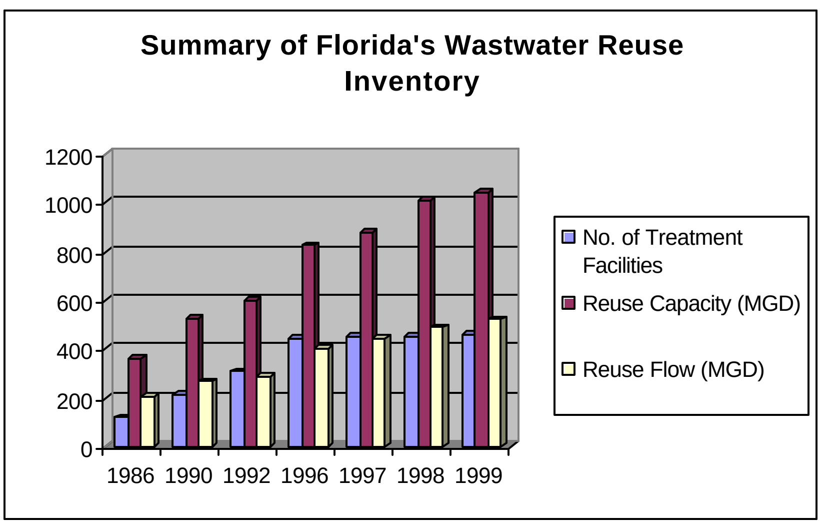
Table II-8	Est. Population Served By Radio Frequency Based SCADA Suported Utilities	Est. Households Served By Radio Frequency Based SCADA Suported Utilities	Est.Daily Volume Supplied By Radio Frequency Based SCADA Suported Utilities (Million Gallons Per Day)
2000	85,252,704	32,415,477	12,787.93
2015	93,950,316	35,722,553	14,092.55
2025	101,497,955	38,592,378	15,224.69

Table II-9	Est. Population Served By Radio Frequency Based SCADA Suported Public Sewers	Est. Households Served By Radio Frequency Based SCADA Suported Public Sewers	Est.Daily Volume Processed By Radio Frequency Based SCADA Suported Public Sewers (Million Gallons Per Day)
2000	104,157,590	39,603,646	15,624
2015	114,783,907	43,644,071	17,218
2025	124,005,244	47,150,283	18,601

With an estimated 85.253 million residents or 30.29% of the nation's total population currently relying upon radio frequency based SCADA supported water utilities for their freshwater supply, and an estimated 104.16 million residents or 37.01% of the nation's total population currently relying upon radio frequency based SCADA supported public sewer systems for the disposal of their wastewater effluent, it is clear that radio frequency based SCADA telemetry now plays a critical role in providing economical water utility service to our nation's households and businesses and will continue to do so in the future.

Looking forward, as water utilities work to expand our nations freshwater supply and dispose of an ever increasing volume of wastewater effluent, traditional methods of wastewater disposal will impact and conflict with freshwater generation efforts. The population growth rates, residential trends and the resulting increased national reliance on utility provided water services previously documented in this paper will severely limit the ability of water utilities to discharge treated wastewater into the nation's surface streams, rivers, lakes and bordering oceans and/or inject such effluent into deep wells created for that purpose. Constrained by the environments ability to absorb and endless volume of wastewater, more and more communities and their utility's are turning to the reuse of reclaimed water as a way to manage their wastewater.

In the absence of national statistics, Florida's reuse experience is instructive and may be considered indicative of reuse trends that can be anticipated to occur nation wide. The chart that appears bellow provides a summary of the total number of domestic wastewater treatment facilities providing water for reuse, the reuse capacities of these facilities and their average reuse flow rates for the years 1986 – 1999.



Source: Florida Dept. of Environmental Protection Division of Water Resources 1999 Reuse Inventory Report (May 2000).

With hundreds and perhaps thousands of miles of overland transmission cable exposed to the environment, it is clear that land line based SCADA systems are very much more vulnerable to service interruptions resulting from natural and/or manmade events and are therefore less dependable.

From the prospective of water utility managers, the durability of a SCADA system is of much greater importance then the individual vulnerability of its exposed equipment components.

Water utility managers typically run their systems under the conservative assumption that all equipment hardware, regardless of its quality, maintenance, location and use, can and will eventually fail. To these professionals it is vitally important that their SCADA telemetry system be able to incur significant equipment damage and/or malfunctions and continue to operate effectively in support of their utility's critical fresh and wastewater processing activities.

Here to the reliance of land line based SCADA telemetry systems on extensive overland transmission systems works to their disadvantage. For example, in the event that a transmission line is severed all remote lift and pumping stations sites reporting SCADA telemetry over that line will be disconnected from their utility and remain so until that line is repaired. Therefore, the possibility exists that a single event, anywhere along the vast cable and/or telecommunications network upon which water utilities typically rely for their SCADA communications, could bring down a water utility's SCADA telemetry system in its entirety resulting in a catastrophic loss of system control.

In contrast, remote sites managed and controlled by a radio frequency based SCADA telemetry system will continue to operate independently (i.e. broadcasting telemetry data and receiving and acting upon operating instructions) regardless of events elsewhere in a utility's SCADA communication system. Thus, the impact of a loss of SCADA telemetry at a remote sites is limited to the operation of that site and that site alone. SCADA telemetry commu nications with all other system sites would be unaffected by the event and thus overall system control would be maintained.

The ability to isolate and contain the impact of SCADA system failures while maintaining overall system connectivity, makes radio frequency based SCADA systems much more durable than land line based alternatives. The durability of radio frequency based SCADA telemetry systems is especially important to water utilities attempting to recover from the region wide destruction caused by events such as hurricanes, tornadoes, ice storms and floods. Testimony to this fact may be found in the experiences of the City of Coral Gables Public Works Department in recovering from hurricane Andrew, a category four hurricane which struck the city on August 24th, 1992, and establishing revised recovery plans for future hurricane events.

With maximum sustained windspeeds of 141 mph, wind gusts of up to 169 mph and a storm surge of 8 – 16 feet, hurricane Andrew completely sundered the city's overland communications network and destroyed 70% of the utility's sanitary sewer lift and pump station control panels[1]. In a report to the City entitled "*Removable Control Components for Sanitary Sewer Lift Stations*" Mr. Tim Clark, Superintendent of the City of Coral Gables Sanitary Sewers Division described in detail the revised Disaster Recovery and Hazard Mitigation plan which the Sanitary Sewers Division had adopted as a result of its experiences in dealing with hurricane Andrew.

The Sanitary Sewers Division's strategy is based on the simple assumption that "if it is not there, it can't be damaged"[2]. Therefore, the utility's revised plan focuses on actions which will be taken by the utility upon the approach of a hurricane to remove and store at secure sites critical operating equipment in advance of the onset of hurricane conditions and then reinstall that equipment upon the subsidence of those conditions.

[1] Timothy Clark, Superintendent – Sanitary Sewers Division, Department of Public Works for the City of Coral Gables.
[2] *Removable Control Components for Sanitary Sewer Lift Stations*, by Timothy Clark, Superintendent – Sanitary Sewers Division, Department of Public Works for the City of Coral Gables.
[21] *Removable Control Components for Sanitary Sewer Lift Stations*, by Timothy Clark, Superintendent – Sanitary Sewers Division, Department of Public Works for the City of Coral Gables.

Central to and a critical component of the City's sanitary sewer revised Disaster Recovery and Hazard Mitigation plan was the acquisition of a radio frequency based SCADA telemetry system whose components (i.e. pump control units, radios and antennas) could be removed from operating equipment at exposed sites by city workers in "no more than three to five minutes[3]". The City successfully located a SCADA system manufacturer whose product met their design and performance criteria and acquired that system in March of 1995.

In 1998, the City of Coral Gables Disaster Recovery and Hazard Mitigation plan and preparedness was subjected to review, inspection and evaluation by the State of Florida's Department of Community Affairs, Division of Emergency Management. The states evaluation resulted in the award of $208,622.00 (50% of the cost incurred by the City in designing and implementing it's Disaster Recovery and Hazard Mitigation plan) to the City under the federally funded State Hazard Mitigation – Section 404 Program[4]. In a letter to Mr. Tim Clark, Sanitary Sewers Division Superintendent, dated August 28, 1998, Mr. Lonnie L. Ryder of the Division of Emergency Management stated that he was "impressed by the electronic lift control module system (i.e. SCADA system) for the City of Coral Gables sanitary sewer system". Mr. Ryder further described the utility's lift control module system as "one of the very best hazard mitigation measures I have ever seen" and states that he will "definitely inform other state, county, and municipal governments of this most worthwhile project"[5].

Without question, features such as limited hardware exposure and the ability to isolate and contain the impact of SCADA system failures while maintaining overall system connectivity, renders radio frequency based SCADA systems much more recoverable than land line based alternatives in disaster situations.

IV. Recommendation.

In view of the demonstrated importance of radio frequency based SCADA telemetry to the provision of economical water services to the nation and the protection of the nation's water supply and fragile ecosystems, Data Flow Systems, Inc. recommends that the 216-220 MHz band be set aside for and dedicated to water utility telemetry uses nationwide.

This recommendation is consistent with the FCC's Strategic Plan as enumerated by William E. Kennard, Chairman FCC, in a FCC publication titled "A New FCC for the 21st Century". In this document, Chairman Kennard states that:

"*The Commission is charged with managing the use of the Nation's airwaves in the public interest for all non-federal government uses, including private sector, and state and local government uses*". Chairman Kennard further stated that "*since spectrum is a finite public resource, it is important that it be allocated and assigned efficiently to provide the greatest possible benefit to the American public*".

Toward these ends, Chairman Kennard recommended the adoption of the following "Key Policy Initiatives":

- "Work with industry and the National Telecommunications and Information Administration to promote the use of technologies and approaches to spectrum allocation and assignment that minimize interference and increase coordination between Government and non-government users.[6]"
- "Promote the efficient use of public safety spectrum to ensure that critical communications needs for the protection of life, health and property are met.[7]"

The absence of a pool of telemetry friendly frequencies dedicated to water utility applications increases the potential for frequency interference by non-CII users and will eventually limit the availability of frequencies for water utility telemetry uses. In fact, water utilities are now and have historically experienced difficulty in obtaining frequency access.

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[22] Florida Dept. Of Community Affairs, Division Of Emergency Management Agreement No. 95-DP-2M-11-23-02-027, Project No. HMGP0955-FL-0091, Disaster No. FEMA-955.

[5] Lonnie L. Ryder, Division of Emergency Management, Florida Department of Community Affairs.
[6] A New FCC for the 21st Century, William E. Kennard, Chairman, FCC. August 1999.
[7] A New FCC for the 21st Century, William E. Kennard, Chairman, FCC. August 1999.

When the FCC has granted such access it most frequently has been on a secondary use basis. Clearly, this situation conflicts with the FCC's stated goals and objectives for the 21st century and threatens the ability of water utilities to provide economical water service to and protect the health and safety of the communities which they serve.

The 216-220 MHz band of frequencies is best suited for CII - water utility set aside for the following reasons:

- The prevalence of CII - utility licensees in this band width. As of December 31, 2000 a total of 123 licensees were using frequencies within the 216-220 MHz band width nationwide. Of these licensees a total 76 or 61.79% were utilities. Thus, the dedication of this band width to water utility applications would cause only a minimal amount of dislocation to utility and non-utility spectrum users.

- Band Characteristics. The 216-220 MHz band width delivers superior signal integrity in hilly and or mountainous terrain due to the propagation characteristics inherent in these frequencies. It is a technically accepted fact that the longer wavelength signals of the 216-220 MHz frequencies are less effected by mid path obstructions, and ground absorption than shorter wavelength signals. This band of frequencies also has the ability to fresnel over or around modest obstructions and can to a certain extent reach beyond normal horizon limits. Thus, the performance characteristics of the 216-220 MHz band are much better suited for SCADA telemetry applications then those of the 450 to 470 MHz Land Mobile Bands, and are vastly superior to 900 MHz or microwave frequencies for most point to point communications in urban and metropolitan environments.

  Further, systems operating in the VHF (216 to 220 MHz) bands require less antenna height and transmitter power or effective radiated power (ERP) than do systems operating in the higher UHF or microwave bands for the same propagation distances. This equates to considerably less expensive initial systems cost for VHF installations. Beyond this, lower antenna heights lessen the impact of antennas placed in residential areas on the aesthetics of those neighborhoods. Lower levels of antenna observability decrease the number and intensity of resident objections to the placement of an antenna in their neighborhood by their water utility.

- The 216-220 MHz band of frequencies is considered to be unattractive to new licensees in a competitive bidding allocation process. The FCC has acknowledged in a published policy statement entitled "Principals for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium" (Policy Statement, 14 FCC Rcd 19868) that the 216-220 MHz band is "already used extensively for existing non-Government services," and that "the presence of these existing services would appear to limit the opportunities for licensing new services on these frequencies". Therefore, the dedication of the 216-220 MHz band to CII uses would not likely interfere with existing initiatives for market based spectrum allocation.

- The comparative public health and safety benefits of competing 216-220 MHz band users. In the above cited FCC policy statement the FCC lists Interactive Video and Data services (IVDS), Wireless Local Loop or Wide band Inter-city Packet Data Service as recommended commercial applications for the 216-220 MHz band. Clearly, the benefits of low cost water utility service, delivered in a sustainable and environmentally friendly manner, outweigh the public health and safety benefits of alternative uses such as video conferencing and paging services.

V. Conclusion.

The documented criticality of radio frequency based SCADA telemetry to the nation's fresh and wastewater utility systems and thus the health and safety of all Americans makes it necessary that these utilities be allocated radio spectrum for their exclusive use. These frequency bands must be highly reliable, free from interference and cost effective. The 216-220 MHz band of frequencies is best suited for this task and should, therefore, be set aside and dedicated to utility telemetry uses nationwide.

WHEREFORE, THE PREMISES CONSIDERED, Data Flow Systems, Inc. recommends that the Federal Communications Commission take action in accordance with the views expressed in these comments.

Respectfully submitted,

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